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# CHILLVENTA eSPECIAL

Refrigeration | AC & Ventilation | Heat Pumps

13.–15.10.2020

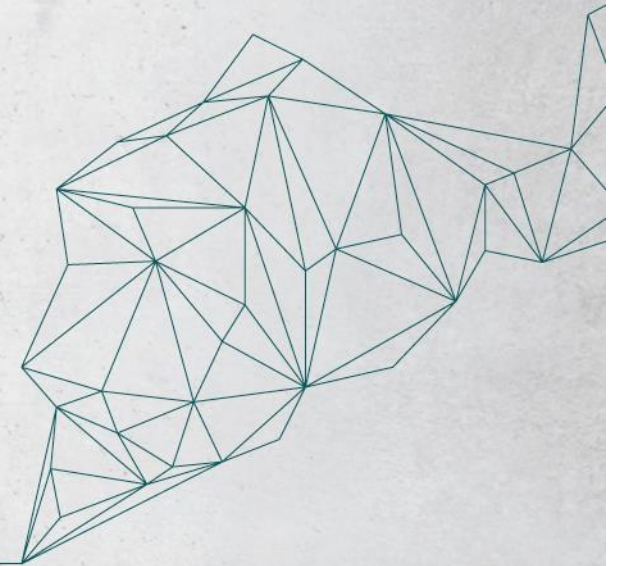
NÜRNBERG MESSE

# Emerson A2L solutions for future-proof refrigeration in food service & food retail applications

**Sylvain Lamy**  
**Director Marketing Refrigeration**

**October 14<sup>th</sup>, 2020**

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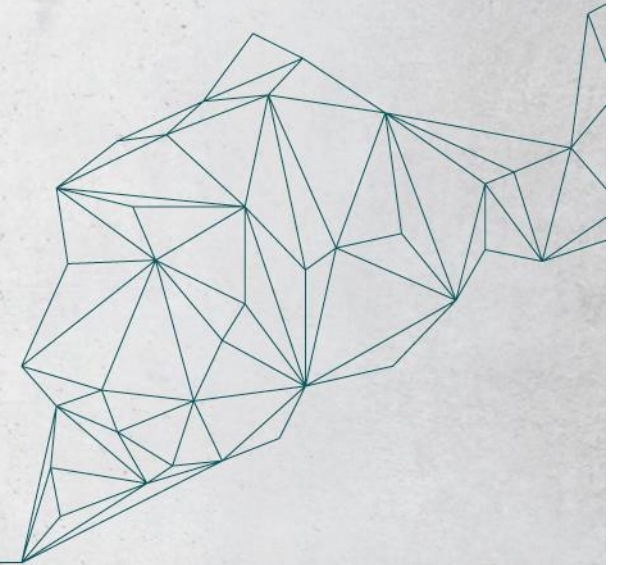
# Emerson A2L solutions for future-proof refrigeration in food service and food retail applications

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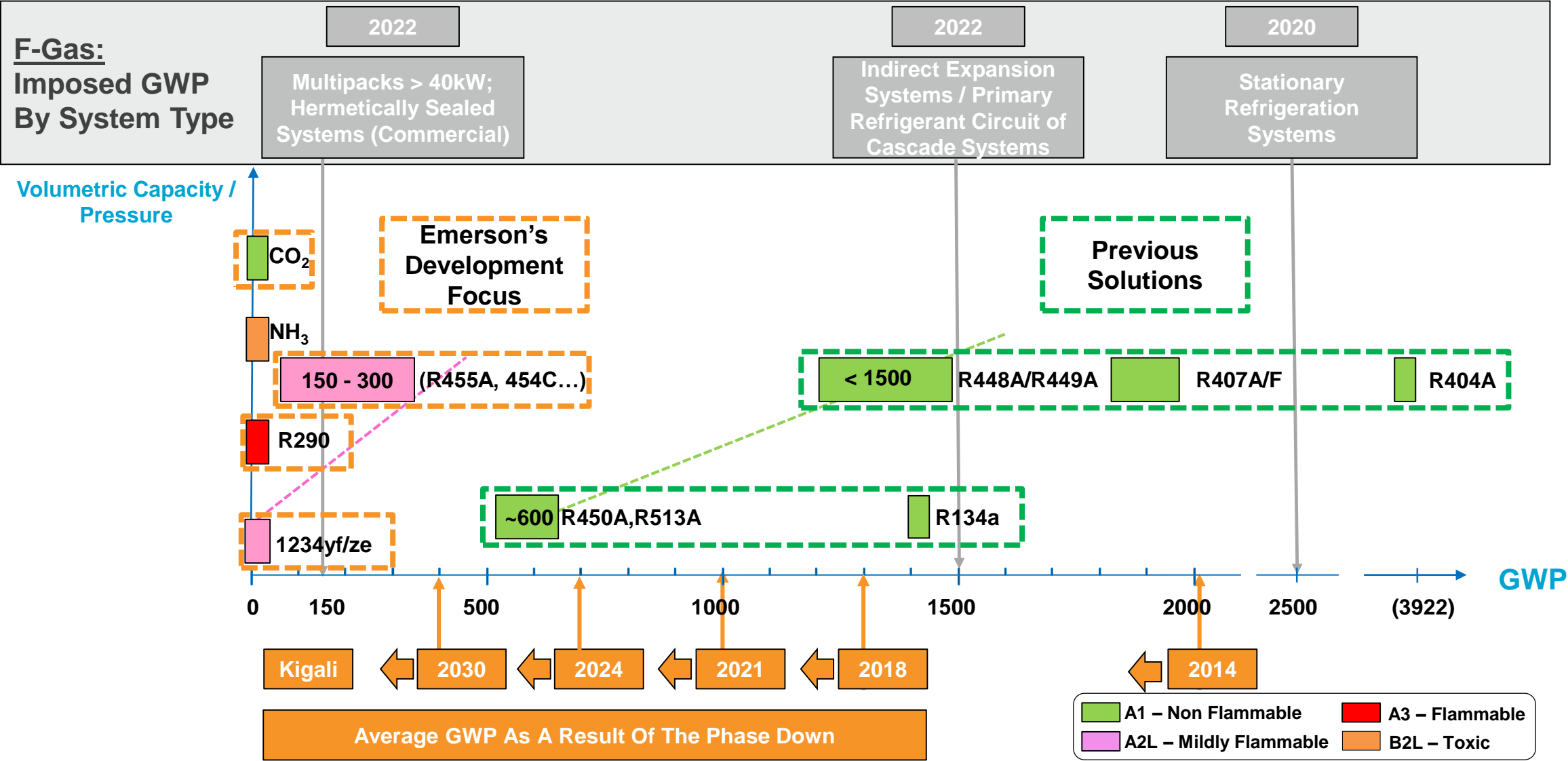
## Agenda

1. **Why A2L in Commercial Refrigeration**
2. **Emerson A2L Product Overview**
3. **Product Details**
4. **Experience In The Field**

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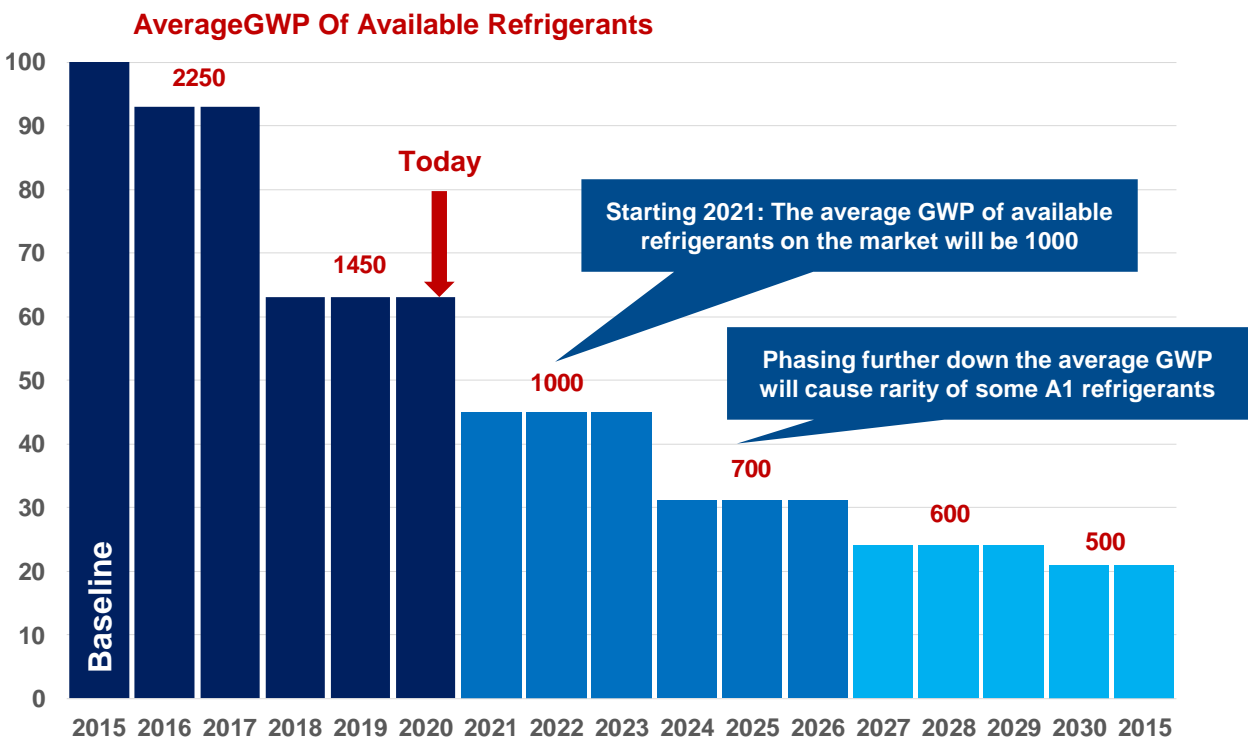


# F-Gas Regulation Drives The Refrigeration Market Towards Co-existence Of CO<sub>2</sub>, R290 & HFO A2L

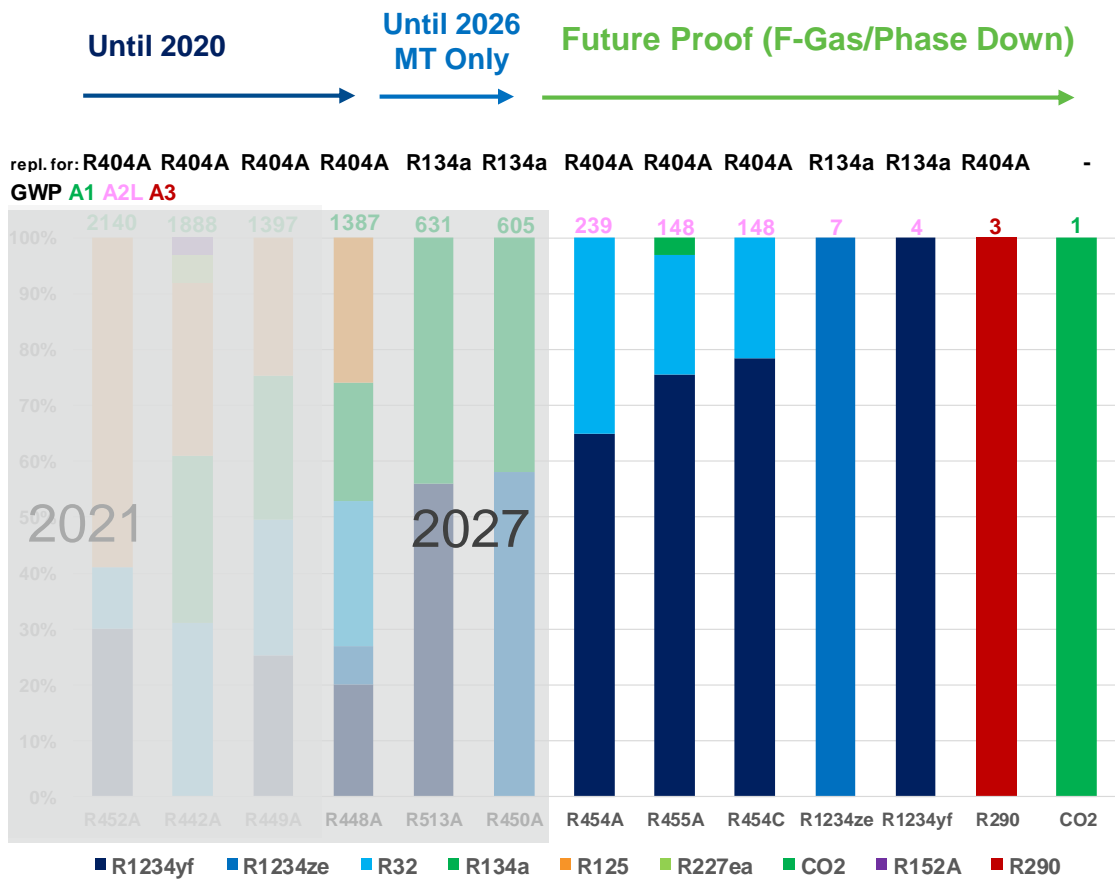


# F-Gas Phase Down This Will Have An Impact On Refrigerant Choice, Sooner Than Later

## F-Gas Phase Down Schedule



## Refrigerant Options



By 2021 It Is Necessary To Be Ready For The Future With R290, CO<sub>2</sub> or A2L Refrigerants

# Predicted Adoption of A2L Refrigerants in Various Architectures of Commercial Refrigeration

## Food Service / Cold Rooms

### Cold Rooms Remote Unit

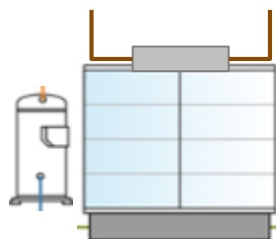


HFC/HFO A1 → 
 LGWP HFO-blend  
CO2?

GWP 2500

## Retail Future Proof «Distributed»

### Integrated Display Cases

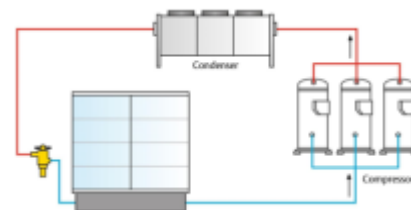


HFO A2L <150    R290 ✓  
CO2 ?

GWP 150

## Retail Future Proof «Centralized»

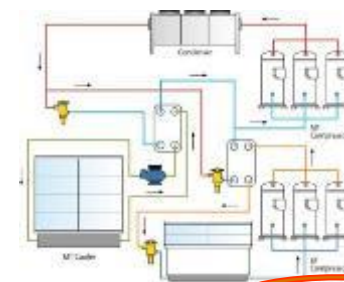
### Centralised Packs > 40kW



HFC/HFO A1 → 
 HFO A2L <150 (Charge limits)

GWP 150

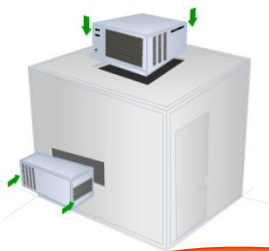
### Hybride / Cascade



HFC/HFO A1 → 
 A2L HFO  
CO2 (LT) → CO2 (LT)

GWP 1500

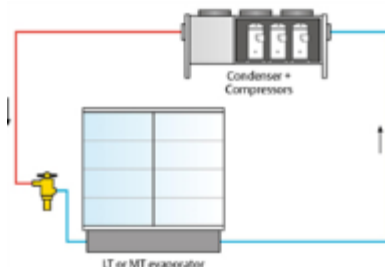
### Cold Rooms Integrated / MonoBlock



HFO A1 → 
 LGWP HFO-blend  
R290  
CO2?

GWP 2500

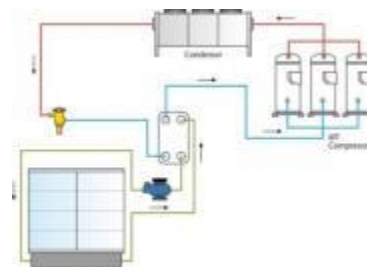
### Units <40kW



HFC/ HFO A → CO2  
LGWP HFO-blends (Charge limits)

GWP 2500

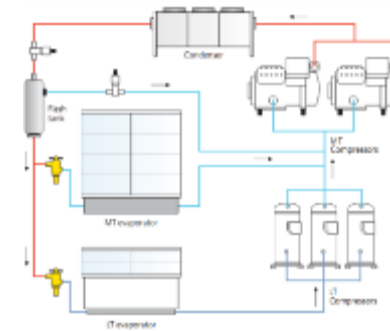
### Indirect Systems / Chillers MT



HFO A2L <150  
R290

GWP 150

### CO2 Booster


















R744

GWP 150

# Refrigerant / System Architecture By Store Format

Co-Existence Of Several Combinations is Expected In The Future

Store Type & Surface Area (m <sup>2</sup> )		Trend Architecture & Refrigerant After 2022		
		Centralised Systems	De-Centralised Systems	Integral Display Cases
Hypermarkets	>2500m <sup>2</sup>	<div>Booster CO2</div> 		
Supermarket & Discounters	1000 to 2500m <sup>2</sup>	<div>Booster CO2</div>  <div>Cascade IDX A2L</div>  <div>Chiller IDX R290</div> 	<div>Multiple Units HFO A2L / CO2</div> 	<div>R290 Water Loop</div> 
Small / Convenient	600 to 1000m <sup>2</sup>	<div>Mini Booster CO2</div>  <div>Small Racks A2L / IDX R290</div> 	<div>Multiple units A2L</div>  <div>Multiple units CO2</div> 	<div>R290 Water Loop / R290 Plug-Ins</div>  
Petrol Stations & City Stores Food Service	<120 to 600 m <sup>2</sup>		<div>Units A2L/CO2</div>  <div>Units A2L</div> 	<div>R290 Plug-Ins</div> 



# Emerson A2L Developments To Provide Technology and Refrigerant Options For The Food Service & Retail Sectors

## Scroll Compressors



- Medium & Low Temperature Application
- Fix and Digital Capacity Modulation
- 3 – 13kW Cooling Capacity
- Multiple Refrigerants R455A, R454C, R454A
- Compressor Design Optimized for A2L
- Reinforce Internal Parts For Maximum Reliability
- Fully Hermetic Design

**Ideal For Cost Effective Compact Units & Racks in Food Service & Small Retail**

## ZX Outdoor Condensing Units



- Medium & Low Temperature Application
- Wide Modulation Range (10 to 100% stepless)
- 4 - 14kW Cooling Capacity
- Multiple Refrigerants R455A, R454C, R454A
- Redesigned For Mildly Flammable Refrigerants
- Designed For Time & Space Saving Installations
- Very Quiet Operation

**Ideal For Cold Rooms, Small Retail & Food Service applications**



# Emerson A2L Developments To Provide Technology and Refrigerant Options For The Food Service & Retail Sectors

## Stream Semi-Hermetic Compressors



- Medium & Low Temperature Application
- Fix, Variable Speed & Digital Capacity Modulation
- 13 to 70kW Cooling Capacity
- Multiple Refrigerants R455A, R454C, R454A, R1234yf/ze
- New modular and scalable compressor electronics For Advanced Protection & Diagnostics

**Ideal For Large Ref. Units & Refrigeration Racks in Retail & Industrial Applications**

## Electronic Controls, Safety Devices & Flow Controls



- Medium & Low Temperature Application
- Multiple Refrigerants R455A, R454C, R454A, R1234yf/ze
- Accurate Flow Control With Mechanical & Electronic Expansion Valves
- Designed To Ensure Maximum Efficiency And Reliability
- Wide Portfolio Of Available Products

**Ideal For A Various Ranges Of Refrigeration Systems and Installations**

# Optimization Of Copeland A2L Scroll For Compact Refrigeration Equipments



- ① Reinforced Parts for High Content of Pure-HFO
- ② Medium Temperature
  - 7 Models Fix Capacity 3 – 13kW
  - 5 Models Digital Modulation 5 – 13kW
- ③ Low Temperature
  - 7 Models Fix Capacity 1 – 8kW Liquid & Vapour Injection
  - 3 Models Digital Modulation 4 – 8kW
- ④ Opportunity To Design Future-Proof Sustainable Refrigeration Equipment
- ⑤ Availability Of A Large Range of Flow & Electronics Controls For Fast Development & Time To Market



Condensing Units / Packs for Cold Rooms & Small Retail Stores



Food Service Applications (Ice Machine, Blast Chillers/Freezers, Milk Tanks)



ALCO CONTROLS™



DIXELL™

# Food Retail Store Installations With A2L Centralized Systems



## Food Store @ Trafford Park

- Application: Multi-compressor rack
- Refrigerant: **R454A** (GWP 249) – 50Kg
- Products: 4 x YB36 with TraxOil
- Energy Consultant: Wave Refrigeration
- Key Driver: TEWI & Low GWP  
Low Cost Premium Vs R404A
- Timing: Started in November 2019
- Status: A2L Racks As Standard



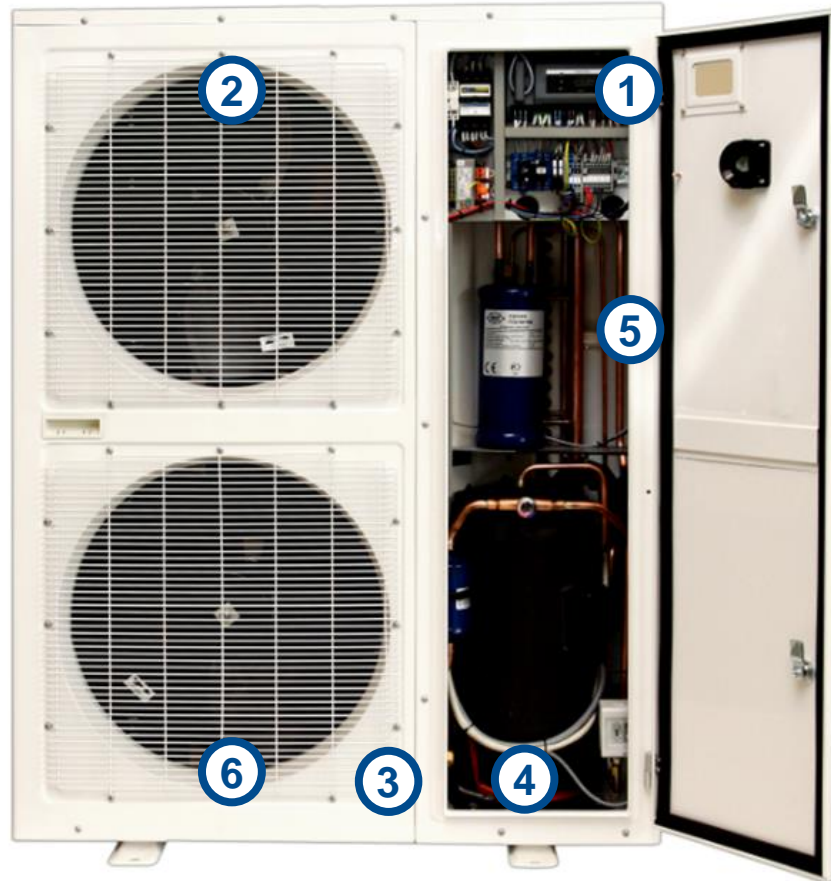
## Food Store @ Langley Park

- Application: Multi-compressor rack
- Refrigerant: **R454C & R455A**(GWP148)
- Products: YB24 + YBD24
- Energy Consultant: Cool Concerns
- Key Driver: TEWI & GWP <150  
System Simplicity
- Timing: Started in Oct 2019
- Status: Approved For Roll Out





# Optimization Of ZX Outdoor Condensing Units For A2L Refrigerants



- ① Main Controller Upgrade (XCM25D Dixell) with New Fan Control Logic For Venting Capabilities & Reliability
- ② New Condenser Fan To Reduce Sound Emission
- ③ New Liquid Receiver
- ④ New Optimized Copeland A2L Scroll YB/YBD/YF For Improved Hermeticity & Reliability
- ⑤ New E-Box Design to Separate Refrigerant Cycle From The Electronics To Avoid Risks Of Ignition
- ⑥ New Mini-Channel Condenser to Reduce The Refrigerant Charge By Up To 50%

**Not only a Refrigerant Qualification  
More Than 20 Design Changes Destined To Improve The Equipment Reliability  
When Working With A2L Refrigerants**

# Food Service Installation Exemple With A2L Condensing Unit

## ZX A2L Installation



## Application

- Application: Cold Room For A Meat Company
- Location: North of Spain
- Refrigerant R454C
- Charge 3,3Kg
- Number Evaporators: One

## Installer Testimonial:

“In terms of the installation, there is no special differences vs installing a standard ZX units..”

# Summary

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- A2L together with R290 & CO2 represent a **valid & sustainable refrigerant option** for the future
- A2L Refrigerants Are Likely To Become Short Term A **Preferred Option In Smaller Charge Systems** – Cold Rooms In Food Service, Small Retail, Kitchen Equipment
- Emerson Invest Significant Resources To Help The Industry To Transition To Future-Proof Solutions With The **Development Of A2L Compression, Unit, Controls Solutions**
- The **Industry Is Already Developing Various Ranges Of A2L** Systems For Commercial Refrigeration - Condensing Units, Cold Room Mono-Blocks, Compact Racks
- Several Sizeable Retailers Have Already **Made The Decision To Chose A2L As Simplicity & Cost** Is Closer to Traditional Systems

**“Less challenges than Hydrocarbons (A3) and Less Complicated than CO2”**



**Thank you for your attention!!!**

**Please visit our virtual booth for further  
info on all our Cold Chain & Human  
Comfort solutions at:**

**<https://emerson.d-art-interactive.de/>**

**For further questions:**

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